

Claims

1. A nonaqueous electrolyte solution comprising the following components:

- i) a lithium salt;
- 5 ii) an electrolyte compound;
- iii) a first additive compound with an oxidation initiation potential of more than 4.2 V; and
- iv) a second additive compound with an oxidation initiation voltage of more than 4.2 V, which is higher
10 in oxidation initiation potential than the first additive, and deposits oxidative products or forms a polymer film, in oxidation.

2. The nonaqueous electrolyte of Claim 1, wherein
15 the content of the first additive is 0.1-2% by weight, and the content of the second additive is 0.5-5% by weight.

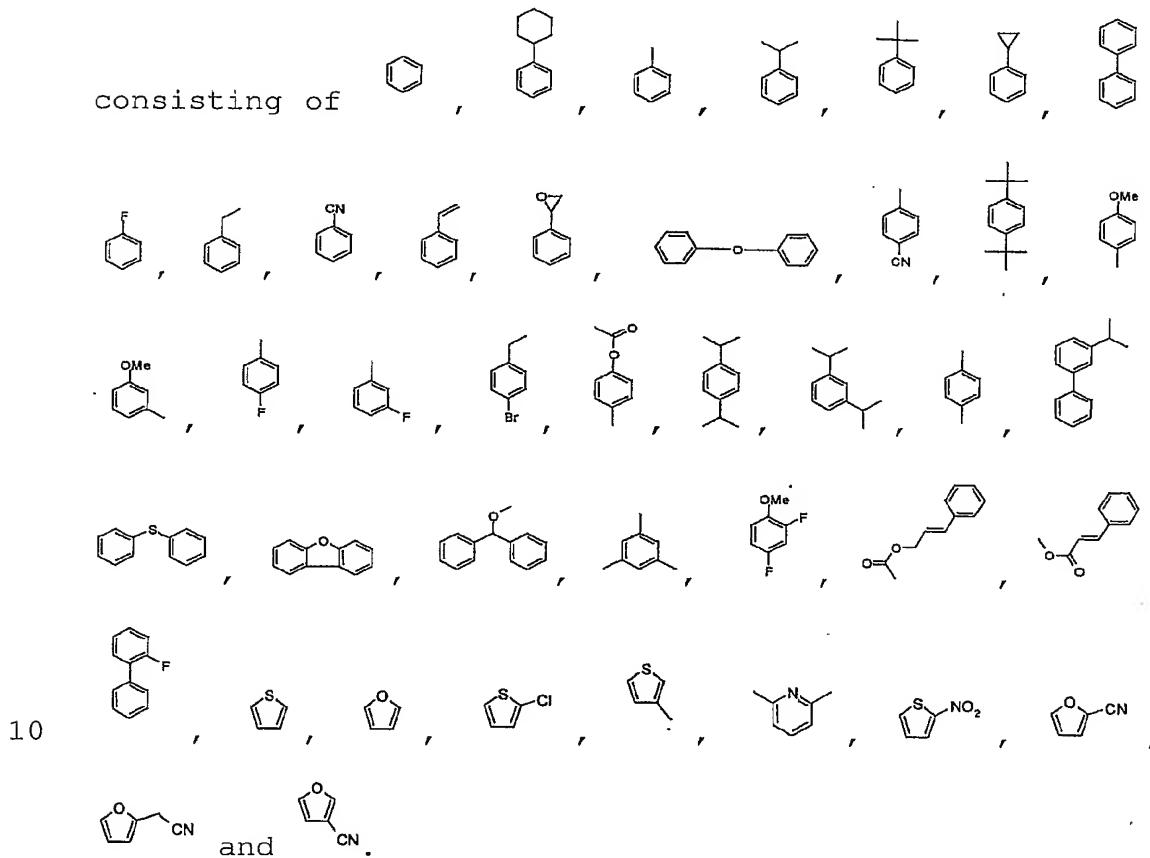
3. The nonaqueous electrolyte solution of Claim 1,
20 wherein the oxidation initiation potential of the additives iii) and iv) is 4.2-5.3V.

4. The nonaqueous electrolyte solution of Claim 3,
wherein the oxidation initiation potential of the
25 additives iii) and iv) is 4.5-4.9V.

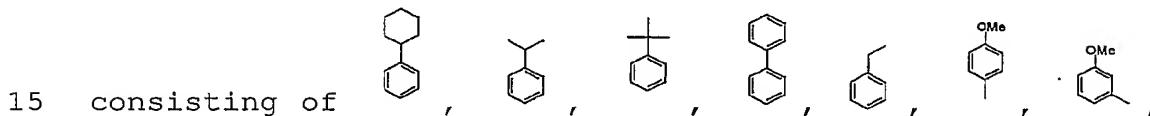
5. The nonaqueous electrolyte solution of Claim 1,
wherein the compounds of the additives iii) and iv) with
an oxidation initiation potential of more than 4.2V are

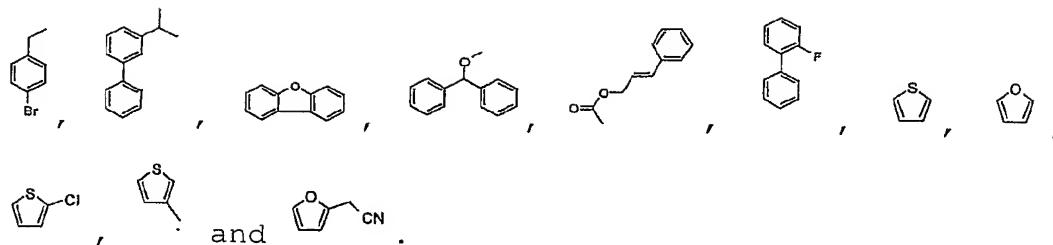
aromatic compounds with an oxidation initiation potential of more than 4.2 V.

6. The nonaqueous electrolyte solution of Claim 1,
5 wherein the first additive is selected from the group



7. The nonaqueous electrolyte solution of Claim 1,
wherein the second additive is selected from the group





8. The nonaqueous electrolyte solution of Claim 1,
5 wherein the first additive is selected from the group

consisting of , , , , , and ,
and the second additive is selected from the group

consisting of , , , , and .

10 9. A lithium secondary battery comprising the
following components:

- a) a cathode capable of absorbing and releasing lithium ions;
- b) an anode capable of absorbing and releasing lithium ions;
- c) a porous separator; and
- d) a nonaqueous electrolyte solution of any one of Claims 1 to 8, the nonaqueous electrolyte solution comprising the following components:
 - i) a lithium salt;
 - ii) an electrolyte compound;
 - iii) a first additive compound with an oxidation initiation potential of more than 4.2 V; and

iv) a second additive compound with an oxidation initiation voltage of more than 4.2 V, which is higher in oxidation initiation potential than the first additive, and deposits oxidative products or forms a polymer film, in oxidation.